

CLAIMS

1. A method for controlling a plurality of base stations in a mobile communication system comprising a communication terminal, said plurality of base stations and a control unit connected to said plurality of base stations, the communication terminal being in communication with said plurality of base stations during a soft handover, the method comprising the steps of:

for each base station of said plurality of base stations, evaluating an uplink channel quality characteristic between said communication terminal and the respective base station,

determining the base station having the best uplink channel quality characteristic,

selecting the determined base station as the serving base station, and

controlling some or all base stations other than the serving base station not to forward data packets received from said communication terminal to said control unit during the soft handover.
2. The method according to claim 1, further comprising the steps of:

receiving a data packet from said communication terminal at said plurality of base stations,

checking data integrity of said received data packet at each of said plurality of base stations, and

if data integrity of said received data packet was confirmed by a base station controlled to forward said received data packet to said control unit, transmitting said received data packet and/or a control packet from the respective base station to said control unit, wherein the control packet acknowledges the correct reception of said data packet.
3. The method according to claim 1 or 2, further comprising the step of:

if data integrity of said received data packet was not acknowledged by a base station, transmitting a notification from the respective base station to said control unit, wherein the notification indicates that data integrity of said received data packet was not acknowledged by said respective base station.

4. The method according to claim 1 or 2, further comprising the step of:

if data integrity of said received data packet was not acknowledged by said serving base station, transmitting a notification from said serving base station to said control unit, wherein the notification indicates that data integrity of said received data packet was not acknowledged by said serving base station.
5. The method according to claim 4, further comprising the steps of:

in response to receiving said notification from said serving base station, said control unit transmitting a status request relating to said received data packet from the other base stations than that selected base station, and

receiving status reports relating to said received data packet from said other base stations, wherein said status report indicates whether data integrity of said data packet was confirmed at the respective base station or comprises said received data packet.
6. The method according to one of claims 3 to 5, wherein said notification and said status report are transmitted to the control unit in at least one frame protocol control frame or by radio network signaling messages over a wired interface.
7. The method according to one of claims 1 to 6, wherein said step of selecting the serving base station is executed by said control unit.
8. The method according to one of claims 1 to 7, wherein said selection of the serving base station is periodically triggered by a configurable timer.
9. The method according to claim 8, wherein said timer value is signaled to said serving base station within a radio link addition function or a combined radio link addition and removal function.
10. The method according to claim 8 or 9, wherein said timer value is signaled to said serving base station in an information element of an NBAP or RNSAP radio link setup request message.
11. The method according to claim 1 to 10, wherein the step of evaluating an uplink channel quality characteristic comprises averaging parameters indicating the uplink channel quality over a configurable time interval.

12. The method according to claim 11, wherein said time interval is configured by at least one signaling message of a radio resource control protocol or at least one system specific control plane protocol message.
13. The method according to claim 11 or 12, wherein said time interval is selected taking into account the velocity in a movement of said communication terminal, the signaling delay between said control unit and a base station, and the signaling delay between different control units in the mobile communication system .
14. The method according to one of claims 1 to 13, wherein said control unit transmits a selection command to the new serving base station upon selection.
15. The method according to claim 14, wherein said control unit further transmits the selection command to the previous serving base station.
16. The method according to claim 14 or 15, wherein the selection command indicates an activation time at which the new serving base station should start forwarding the successfully received data packets, control packets or notifications to said control unit and at which the previous serving base station should stop forwarding the successfully received data packets, control packets or notifications to said control unit.
17. The method according to claim 16, wherein the previous serving base station and said control unit negotiate said activation time by exchanging control messages.
18. The method according to claim 17, wherein said control message is one of a radio link reconfiguration message, an activation time negotiation request message, and an activation time confirmation message of NBAP or RNSAP protocols.
19. A method for controlling a plurality of base stations in a mobile communication system comprising a communication terminal, said plurality of base stations and a gateway interconnecting said mobile communication network to a fixed communication network, the communication terminal being in communication with said plurality of base stations during a soft handover, the method comprising the steps of:

for each base station of said plurality of base stations, evaluating an uplink channel quality characteristic between said communication terminal and the respective base station,

determining the base station having the best uplink channel quality characteristic,

selecting the determined base station as the serving base station, and

controlling some or all base stations other than the serving base station not to forward data packets received from said communication terminal to said gateway unit during the soft handover.

20. The method according to claim 19, further comprising the steps of:

receiving a data packet from said communication terminal at said plurality of base stations,

checking data integrity of said received data packet at each of said plurality of base stations, and

if data integrity of said received data packet was confirmed by a base station controlled to forward said received data packet to said gateway, transmitting said received data packet from the respective base station to said gateway.

21. The method according to claim 19 or 20 , further comprising the steps of:

if data integrity of said received data packet was not acknowledged by said serving base station, transmitting from said serving base station a status request relating to said received data packet to the other base stations than said serving base station, and

receiving status reports relating to said received data packet from said other base stations, wherein said status report indicates whether data integrity of said data packet was confirmed at the respective base station or comprises said received data packet.

22. The method according to one of claims 19 to 21, wherein said notification and said status report are transmitted to said serving base station in at least one frame protocol control frame or by radio network signaling messages over a wired interface.

23. The method according to one of claims 19 to 22, wherein said step of selecting the serving base station is executed by the current serving base station.

24. The method according to claim 1 to 23, wherein said uplink channel quality characteristic is determined based on at least one of a path loss for an uplink channel between said communication terminal and the respective base station, closed loop power control commands transmitted by a base station to said communication terminal, and uplink interference.
25. The method according to one of claims 1 to 24, wherein said selection of the serving base station is independent from uplink data channel air interface transmission.
26. The method according to one of claims 19 to 25, wherein said selection of the serving base station is periodically triggered by a configurable timer.
27. The method according to claim 19 to 26, wherein the step of evaluating an uplink channel quality characteristic comprises averaging parameters indicating the uplink channel quality over a configurable time interval.
28. The method according to claim 27, wherein said time interval is configured by radio resource control signaling or another system specific control plane protocol.
29. The method according to claim 27 or 28, wherein said time interval is selected taking into account the velocity in a movement of said communication terminal, and the signaling delay between at least two base stations of said plurality of base stations.
30. The method according to one of claims 19 to 29, wherein the current serving base station transmits a selection command to the new serving base station upon selection.
31. The method according to claim 30, wherein the selection command indicates an activation time at which the new serving base station should start forwarding the successfully received data packets to a gateway interconnecting the mobile communication network to a fixed communication network, and at which the previous serving base station should stop forwarding the successfully received data packets to the gateway.
32. The method according to one of claims 15 to 18 or claim 30 or 31, wherein the previous or current serving base station and the new serving base station

continue their serving base station functionality in parallel for a predetermined time period.

33. The method according to one of claims 14 to 18 or claim 30 or 31, wherein the selection command is transmitted in an information element of NBAP or RNSAP message.
34. The method according to one of claims 1 to 33, wherein the received data packet is transmitted in at least one frame protocol data frame and the control packet and/or the notification is transmitted in at least one frame protocol control frame.
35. A base station in a mobile communication system wherein a communication terminal is in communication with a plurality of base stations during a soft handover, wherein said base station comprises means for implementing the method according to one of claims 1 to 34.
36. A control unit in a mobile communication system comprising a communication terminal, a plurality of base stations and said control unit connected to said plurality of base stations, the communication terminal being in communication with said plurality of base stations during a soft handover, wherein said control unit comprises means for implementing the method according to one of claims 1 to 18.
37. A method for signaling uplink channel quality characteristics from a communication terminal to a control unit in a mobile communication system comprising the communication terminal, a plurality of base stations and the control unit connected to said plurality of base stations, said communication terminal being in communication with said plurality of base stations during a soft handover, the method being specifically adapted to the control of said plurality of base stations according to one of claims 1 to 18.
38. A method for signaling uplink channel quality characteristics from a communication terminal to a base station in a mobile communication system comprising the communication terminal and a plurality of base stations, said communication terminal being in communication with said plurality of base stations during a soft handover, the method being specifically adapted to the control of said plurality of base stations according to one of claims 19 to 34.

39. The method according to claim 37 or 38, wherein said method comprises the steps of:
- receiving power control commands from said plurality of base stations,
- for each base station of said plurality of base stations, the communication terminal determining a channel quality characteristic related to each base station based on the power control commands received from the respective base station, and
- transmitting said determined channel quality characteristics to said control unit via a base station, wherein said determined channel quality characteristics are considered by said control unit or said serving base station to select a serving base station.
40. The method according to claim 39, wherein determining said channel quality characteristic for each base station comprises combining said power commands received from the respective base station over a configurable time period.
41. A communication terminal in a mobile communication system comprising the communication terminal, a plurality of base stations and a control unit connected to said plurality of base stations, the communication terminal being in communication with said plurality of base stations during a soft handover, wherein said communication terminal comprises means for implementing the method according to one of claims 37 to 40.
42. A mobile communication system comprising a communication terminal according to claim 41, a plurality of base stations and at least one control unit according to claim 36 connected to said plurality of base stations, the communication terminal being in communication with said plurality of base stations during a soft handover, said plurality of base stations comprising at least one base station according to claim 35.
43. A mobile communication system comprising a communication terminal according to claim 41 and a plurality of base stations, the communication terminal being in communication with said plurality of base stations during a soft handover, said plurality of base stations comprising at least one base station according to claim 35.